WinEducate Institute
PREPARATORY TEST 1
COMPUTER SCIENCE
Topic : Boolean Algebra & Computer Hardware

Maximum Marks: 20
Time allowed: One and a half hours

Part A: Multiple Choice Questions

1. The expression for Absorption law is given by _____ . [1]
a) A + AB = A
b) A + AB = B
c) AB + AA' = A
d) A + B = B + A

2. According to boolean law: A + 1 = ? [1]
a) 1
b) A
c) 0
d) A'

3. The involution of A is equal to _____ [1]
a) A'
b) A
c) 1
d) 0

4. A(A + B) = ? [1]
a) AB
b) 1
c) (1 + AB)
d) A

5. DeMorgan's theorem states that _____ [1]
a) (AB)' = A' + B'
b) (A + B)' = A' . B
c) A' + B' = A'B'
d) (AB)' = A' + B

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6. The statement (~P<->Q)∧~Q is true when? [1]
a) P: True Q: False
b) P: True Q: True
c) P: False Q: True
d) P: False Q: False

7. If P is always against the testimony of Q, then the compound statement P→(P v ~Q) [1]
is a _____
a) Tautology
b) Contradiction
c) Contingency
d) None of the mentioned

8. Identify the most simple SOP expression which generates the Karnaugh map shown: [1]
a) A'B' + A'C' + B'C + ABD'
b) A'C' + AD' + B'CD
c) A'B'D + C'D' + ACD'
d) A'B' + A'C' + AC

	C'D'	C'D	CD	CD'
A'B'	1	1	1	
A'B	1	1		
AB	1			1
AB'	1		1	1

9. What is the dual of (A ∧ B) v (C ∧ D)? [1]
a) (A V B) v (C v D)
b) (A V B) ^ (C v D)
c) (A V B) v (C ∧ D)
d) (A ∧ B) v (C v D)

10. ~ (A ∨ q) ∧ (A ∧ q) is a _____ [1]
a) Tautology
b) Contradiction
c) Contingency
d) None of the mentioned

11. The contrapositive of p → q is the proposition of _____ [1]
a) ~p → ~q
b) ~q → ~p
c) q → p
d) ~q → p

12. If X=1, Y=0, Z=1 , then the minterm will be: [1]
a) X + Y' + Z
b) XY'Z
c) X'Y'Z
d) X' + Y' + Z

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13. There are _____ cells in a 4-variable K-map. [1]
a) 12
b) 16
c) 18
d) 8

14. A universal logic gate is one which can be used to generate any logic function. [1]
Which of the following is a universal logic gate?
a) OR
b) AND
c) XOR
d) NAND

15. Exclusive-OR (XOR) logic gates can be constructed from what other logic gates? [1]

a) OR gates only
b) AND gates and NOT gates
c) AND gates, OR gates, and NOT gates
d) OR gates and NOT gates

16. (X+Y')(X+Z) can be represented by _____ [1]
a) (X+Y'Z)
b) (Y+X')
c) XY'
d) (X+Z')

17. Simplify the expression: A' (A + BC) + (AC + B'C). [1]
a) (AB'C+BC')
b) (A'B+C')
c) (A+ BC)
d) C

18. The complement of the Boolean expression F(A,B) = (A.B + A'B') is: [1]
a) (A' + B').(A + B)
b) (A + B').(A + B)
c) (A' + B').(A + B')
d) (A' + B).(A' + B)

19. Reduce the given Boolean function F(A,B,C,D) = ∑(1,3,5,7,8,9,10,11,14,15) by using 4 variable Karnaugh map and answer the following questions:

(a) What will be the least number of groups and their types formed for reduction? [1]
(i) 6 pairs
(ii) 2 quad and 2 pairs
(iii) 1 quad and 3 pairs
(iv) 3 quads

(b) The reduced expression of the Boolean function given above is: [1]
(i) ACD' + B'D' + BD
(ii) (A+C'+D').(B'+D').(A+C')
(iii) A'D+AC+AB'
(iv) (C+D'). (B'+D').(A+B+D)

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Part B: Descriptive Questions

Q1. Draw the logic gate diagram for the following [2X5=10]

1. A'B+AB'+(AB)'
2. $(A \oplus B \oplus C)$
3. $(A \odot B)$
4. AND using NOR
5. OR using NAND

*****All the best*****